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Applicants ask that you kindly change your records to reflect the attorney docket code as 60990005Z126. A request for corrected filing receipt is attached.

REMARKS

Applicants thank Examiner James A. Thompson for having expressly conceded that the August amendments distinguish the cited art.

The current Official Action also contains an extended argument, which appears to be moot, about Harza. Nevertheless the Applicants wish to thank the Examiner for having expressed his views.

Please note that independent claims 1, 25, 34, 36 and 40 have not been amended.

Section 102 rejections

In the Official Action it is said that claims 34 through 36 are anticipated by Hackleman. For the reasons set forth below, Applicants respectfully traverse.

As to claim 34 — The Applicants' claim 34 recites (emphasis added):

"modifying a multicolumn, multirow numerical tabulation that forms a mapping between . . . input image data and . . . marks".

In the Official Action it is said that Hackleman discloses (top of page 5, emphasis added):

"modifying a multicolumn, multirow numerical tabulation (figure 3 (56) and column 4, lines 56-60 of Hackleman) that forms a mapping between . . . input image data and . . . marks".

With respect, this assertion is factually in error in the following four ways, any one of which would be sufficient to overcome the rejection:

- 1) Hackleman's Fig. 3 is not a picture of a tabulation, numerical or otherwise — or of modifying anything, either. It is just a diagram of four inkjet print-heads.
- 2) Hackleman's callout 56, in Fig. 3, is pointing to an inkjet nozzle.
- 3) Column 4, lines 56 through 60, of Hackleman likewise teach nothing whatsoever about any numerical tabulation. That passage reads, substantially in toto:

"The position of each nozzle 56 on such printhead 38 also is measured with respect to reference points 74, 76, 78 on each of the other print-heads (e.g., 40, 42, 44). The process then is repeated for each nozzle on each printhead 40-44."

- 4) Even if Hackleman's Fig. 3, callout 56, were a portrayal of a numerical tabulation (which it is not), it would not be a multicolumn tabulation as recited in claim 34. Applicant's specification explicitly defines "multicolumn" to mean "more than ten columns", i. e. eleven or more; and Hackleman's drawing shows only eight generally vertical lines of inkjet nozzles, not eleven.

Turning to claim 35 — Applicant's claim reads (emphasis added) :

"applying the correction pattern to modify a halftone thresholding process".

In the Official Action it is proposed (page 5, second paragraph) that Hackleman's shifting of dots around, by aligning the printheads better, modifies a halftoning process. In actuality the alignment of printheads interacts with the halftone process, which itself remains intact and undisturbed.

The extremely strained interpretation that is presented in the Official Action ignores the clear intent of the subject claim language; however, this line of reasoning leads to a semantic quagmire rather than to resolution of this application. Therefore in the interest of advancing this application toward issue, Applicants have amended claim 35 to even more emphatically clarify the original intent.

The amended claim now specifies explicitly that the halftone thresholding process in question "uses a halftoning matrix which is a predefined numerical array", and also that "the applying step comprises preparing a modified form of the

predefined numerical array, and then using that modified form of the array.

These recitations are based upon the specification as originally filed — and, furthermore, simply articulate the above-mentioned self-evident intent of the original claim language. No new matter is added.

The claim thus plainly distinguishes Hackleman, since he teaches nothing about modifying the predefined halftoning array as specified.

Next taking up claim 36 — the Applicants' subject claim recites that printing is (emphasis added):

"subject to print-quality defects due to departure of printing-medium advance from an optimum value"

— and also that the invention includes the step of (emphasis added):

"measuring a parameter related to such print-quality defects".

In short, the invention as claimed includes "measuring a parameter related to . . . print quality defects" that are "due to departure of printing-medium advance from an optimum value".

In the Official Action it is asserted (page 5, bottom paragraph) that (emphasis added):

"Hackleman discloses measuring a parameter related to print-quality defects due to departure of printing-medium advance from an optimum value (figure 3 and column 3, lines 53-57 of Hackleman)".

With respect, this assertion is factually in error, for these three reasons — any one of which would suffice to remove the asserted grounds of rejection:

- 1) Hackleman's Fig. 3 shows nothing about printing-medium advance — neither about variation of such advance, nor about an optimum value of such advance; and furthermore nothing about measuring any parameter expressly related to such an advance.
- 2) Hackleman's column 3, lines 53 through 57, says nothing about printing-medium advance — rather he says, in that passage (considered, once again, substantially in toto):

"Often, however, the printhead or the nozzles are manufactured slightly out of alignment. For viewing and discussion purposes, the nozzles 56 in Fig. 3 are shown to be of an exaggerated size and spacing, and to be out of an alignment by an exaggerated amount."

Like the last-previously quoted text passage, this one has nothing whatever to do with the purported topic of printing-medium advance!

- 3) Finally, nowhere in Hackleman is there any mention of printing-medium advance.

Since the foregoing discussion and amendment eliminate all three of the Section 102 rejections, the Applicants respectfully ask that all three be withdrawn.

Section 103 rejections

It is additionally said in the Official Action that certain claims are obvious over Hackleman in combination with Koike. Those are claims 1 through 15, claim 18, claims 22 through 30, claim 33, and claims 37 through 42.

First, of these claims, the rejections of claims 1, 37, 38 and 40 all rest directly upon the same wholly mistaken assertions discussed above regarding claim 34. More specifically, it is again said in the Official Action — as to all four of these claims — that the Hackleman patent anticipates (emphasis added):

"modifying a multicolumn, multirow numerical tabulation (figure 3 (56) and column 4, lines 56-60 of Hackleman) that forms a mapping between . . . input image data and . . . marks".

For the same reasons stated at pages 23 and 24 above, this assertion is incorrect, and the associated rejections improper.

Furthermore, the rejections — in whole or in part on the same grounds — of all the claims that depend from claims 1, 37, 38 and 40 are also now seen to be improper. Those claims are claims 2 through 8, claim 39, and claims 41 and 42.

Moreover, the rejections of claims 2, 3, 6 and 8 — as will be shown below — also appear to be wrongly argued, even apart from the errors in rejection of base claim 1. In addition, claim 9 has been subject to the same misinterpretation as claim 35, discussed above (and has now been correspondingly amended).

As to claim 2, in the Official Action it is said (sentence bridging pages 7 and 8, emphasis added):

"Hackleman discloses that the mapping is selected from the group consisting of an optical-density transformation of the image data to such construction from individual marks (column 4, lines 37-39 and lines 43-49 of Hackleman)"

In actuality, however, the text in those two cited passages says, respectively:

"According to various alternative methods of this invention, misalignment of the printhead and nozzles is measured optically. Fig. 4 shows a block diagram of the" [sic, truncated sentence]

and

"the printing device 10. [sic, sentence fragment]
The optical measuring system includes one or more light-emitting or infrared emitting devices and one or more light detection or infrared detection devices. In addition, the system 70 includes structures for directing and/or scanning the emitting and detecting devices to desired locations, along with logic or processing devices for determining-absolute or relative position measurements."

As will be apparent, neither of these cited passages is even remotely related to the topic for which the passages were purportedly cited.

With respect, this portion of the Official Action, and particularly these citations, are not understood. The Applicants therefore respectfully ask that these miscited passages be more fully explained and clarified, or the rejections based thereon be withdrawn.

As to claim 3, in the Official Action it is said (top half of page 8, emphasis added):

"Hackleman discloses that the optical-density transformation comprises a halftoning matrix (column 4, lines 46-52 of Hackleman). By measuring based on the precise pixel positions (column 4, lines 46-52 of Hackleman) [sic, duplicate citation], the half-toning matrix - specifically the pixel positions comprising the halftoning matrix - are used as part of the optical-density transformation.

"Hackleman further discloses that the spatial-resolution relationship comprises a scaling of the image data to such pixel grid (column 4, lines 56-62 of Hackleman)."

In the cited passages, however, once again there appears no evident connection to the argument points for which the passages have been cited. Starting with column 4 at lines 46 through 52, that irrelevant passage reads:

"In addition, the system 70 includes structures for directing and/or scanning the emitting and detecting devices to desired locations, along with logic or processing devices for determining-absolute or relative position measurements. For example, in one embodiment the system 70 is locked on a first target, then a second target thereafter, the distance between the two images is calculated."

N. b., there is nothing here about optical density, nothing about a transformation, nothing about halftoning or a matrix. Turning to the second irrelevant passage, it reads:

"The position of each nozzle 56 on such printhead 38 also is measured with respect to reference points 74, 76, 78 on each of the other printheads (e.g., 40, 42 44). The process then is repeated for each nozzle on each printhead 40-44. The reference points 72-78 are datums manufactured into each printhead as an elevated structure of known size and shape. According to an alternative method step, the" [sic, truncated sentence].

Again, nothing about spatial-resolution, or about scaling. Applicants respectfully point out that nothing has been underscored for emphasis in either of these passages, because in fact there is nothing relevant in either of them.

Please note that in the Official Action it is repeatedly said, "Hackleman discloses . . ." — but in actuality, Hackleman does not. At least these particular assaults upon the claims are based not upon the reference at all, but rather upon a structure of ideas that appears to be rooted in extensive personal knowledge and opinions about the incremental-printing field. The Applicants respectfully submit that this kind of examination, this kind of citation, are without full authority and are improper.

While it is understood that the Official Action offers an overlay of interpretation, there is nothing in these passages that either supports or even motivates the interpretation. The Applicants respectfully submit that the citations only give an appearance of relying upon Hackleman but actually provide no link between that patent and the points made in the Action.

As to claim 6, it is said in the Official Action (emphasis added):

"Hackleman discloses that . . . the . . . error comprises a swath-height error (figure 3 and column 3, lines 53-57 of Hackleman); [and] means for measuring the swath-height error . . . (column 4, lines 37-41 of Hackleman); and . . . means for applying the respective swath-height error"

Still again here, these citations are most remarkable. In truth figure 3 shows an internal error in the advance-axis direction, but no error whatsoever in swath height.

Columns 3 and 4, at the two passages cited, are likewise devoid of all reference to swath height, or error in swath height, or measurement of either the height or the error. It would be cumulative to set forth here yet another set of irrelevant excerpts from Hackleman.

As to claim 8, in the Official Action (page 11) the same faulty citations and assertions are repeated — except that the reference to "means for applying" swath-height error is replaced by "means for deriving a correction pattern from the measured swath-height error or determined optimum distance", and the Action introduces a new but equally disappointing citation to Hackleman's column 6, lines 47 through 50. All of these citations appear to be mistaken.

Applicants therefore request withdrawal of the rejections of claims 1 through 8, and claims 37 through 42.

This discussion turns next to claims 9, 10, 12, 14, 15, and 23 through 25. Although not depending from claims 1, 37, 38 and 40, these claims are all rejected based on the same inapposite arguments discussed above. The rejections are therefore all believed to be likewise either improper or obviated by trivial amendment — so as to reassert the plainly intended structures of the initial claim language. The details behind this general statement, for those eight claims, will now be taken up in turn:

Rejection of claim 9 is inapposite. While the claim says that invention operates to "modify a halftone process", the Action responds that Hackleman's shifting of dot positions to eliminate misalignments also modifies a halftone process. As

noted above in connection with claim 35, this is not precisely true.

In actuality Hackleman's shifted dots merely interact with the halftone process — possibly changing dot intensity, only incidentally, and only in some unusual circumstances. The present invention, by comparison, does systematically modify the halftone process itself.

In the interest of advancing this case toward issue, the Applicants have accordingly amended claim 9 to specify that the halftone process includes use of a predefined numerical array, and that the operation of the present invention uses a modified form of this array. This recitation is believed to distinguish the verbal coincidence upon which the rejection relies.

Rejection of claim 10 is inapposite. The argument in the Official Action appears to include identifying "the misalignment information" as both (1) the printmask and (2) at the heart of the halftoning. In a very academic or abstract sense this may possibly seem logical enough, but as a practical matter printmasks and halftone matrices are very well-defined concepts in this field, and everyone skilled in the field is well aware of the accepted definitions.

Nevertheless, once again in the interest of advancing this case toward issue, the Applicants have currently amended claim 10, as well as claim 9, thereby obviating both of these misleading interpretations — in addition to the associated rejections.

Rejection of claims 12, 14 and 25 is improper. In the Official Action as to claims 12 and 14 it is said (pages 13 and 14, emphasis added):

"Hackleman discloses that . . . steps are [. . .]
also employed to modify swath height . . . , for
accommodating any swath-height error present . . .
(figure 3; column 4, lines 37-41 . . . and column 6,
lines 47-54 . . .)."

Similarly as to claim 25 it is said (page 16, emphasis added):

"Hackleman discloses measuring a parameter related to
print quality defects due to departure of printing
medium advance from an optimal value (column 4,
lines 53-60 of Hackleman); and, based on the mea-
sured parameter, scaling the input image data to
compensate for said departure (column 4, lines 56-62
of Hackleman)."

These statements are factually in error, being without basis in the Hackleman patent. Although it is true that Hackleman shows and mentions measuring nozzle-positioning errors in the advance-axis direction, he never mentions swath height, and therefore of course never mentions swath-height error.

Classically the purpose of measuring nozzle-positioning errors along the advance axis is only for the purpose of shifting the actually-used segment of the nozzles up or down along the full height of the nozzle array. That is done using spare nozzles reserved for this purpose at top or bottom of the nozzle array — as described, for example, in column 10 of Cobbs.

At the time of the invention, any person skilled in this field noting Hackleman's measurements in the advance axis would assume that such shifting is his objective. In such advance-axis shifts, there is no shortening or lengthening of either the nozzle array or its actually-used segment (i. e. the swath height).

Applicants respectfully reiterate that the specifically cited materials in Hackleman — figure 3; and column 4, lines 37 through 41, and lines 53 through 60; and column 6, lines 47 through 54 — appear to have no relationship at all to the subject matter purported to appear there. Applicants respectfully request clarification or withdrawal of these rejections.

Rejection of claims 15 and 16 — These claims merely specify their parent claim 9 to the respective conventional subareas of halftoning by way of (1) dither masking and (2) error diffusion, respectively. Thus as noted above claim 9 (particularly as now amended) is novel and unobvious as applied to both these techniques, and to either one.

Hackleman, however, at column 4, lines 31 through 36 (the passage cited in the Action on page 14, third paragraph), says nothing at all about the halftone thresholding process — or about a halftone matrix.

As to rejection of claims 23 and 24, these claims too depend from claim 9, and so are patentable in view of the patentability of the now-narrowed claim 9, without more. Nevertheless, these dependent claims even further distinguish Hackleman, both alone and in obviousness combinations.

More specifically, in the Official Action as to claim 23 it is said that (page 15, emphasis added) —

"Hackleman discloses that the applying step comprises modifying the darkness of substantially each mark printed by an individual printing element whose density is defective (column 6, lines 60-64 of Hackleman)."

In support of this argument, the Action goes on to explain once again the creative interpretation that shifting of dots interacts with a dither matrix to change tonal density.

Even if that interpretation be accepted as true, *arguen- do*, nevertheless the above-quoted statement as a general rule is not true. To put it the other way around, the statement might conceivably be true in some occasional specific cases, but only on the basis of a remote, possible indirect effect.

This is so because there is no reason to believe that the darkness of "each" such mark will be modified. Darkness of some such marks may possibly be modified; and darkness of others is likely not to be modified.

It would be very extraordinary if darkness of all the marks (*i. e.* "each" mark) were modified. This is because an element whose density is defective is not necessarily an element that is mispositioned or mispointed; the two phenomena are distinct and different, and there is no reason to assume correlation between them as a general rule.

For the same reason the argument in the Official Action about claim 24 is also true in specific cases but only as a remote, possible indirect effect — not as a general rule. For these interconnected reasons these rejections as asserted in the Official Action are not proper, and their withdrawal is requested.

It is also said in the Official Action that claims 31 and 32 are obvious over Hackleman in combination with Koiko and Cobbs. Claim 31 recites (emphasis added):

"comparing optimum advance values or swath- height values measured for the plurality of multielement printing arrays respectively, to find the smallest of said values;

"selecting a particular multielement printing array whose said value is . . . smallest;

"using, in common for the plurality of printing arrays, . . . said selected smallest value".

The rejection, however, ingeniously matches this wording with teachings of the Cobbs patent — only by seizing upon a trivial case in that patent, namely the case in which all the values are the same! Therefore all the values are the smallest (and of course all the values are the largest, too).

Needless to say this rejection does not deal with what is often called the "real invention" but only represents an effort to meet the claim language — with prior art that is substantively irrelevant. Accordingly claim 31 has been amended to specify that at least some of the values are different from one another.

In view of this amendment, the asserted rejections are inapposite. Applicants therefore ask that this rejection be withdrawn.

Claims not specifically discussed above, but depending from various of the claims that are discussed, include these twenty claims:

claims 4, 5, 7, 11 and 13;
claims 17 through 22;
claims 26 through 31;
claim 39; and
claims 41 and 42.

It has been shown above that rejections of all the parent claims of these twenty claims are improper, or in a few cases obviated by current amendment. Those parent claims are 1, 9, 16, 25, 38 and 40. Therefore the Applicants respectfully submit that the twenty listed claims, too, are patentable.

Substantive effects of the invention — The foregoing discussion of the claim rejections focuses upon some misread-

ings of the cited art, and also upon verbal coincidences that have been invoked in efforts to show that the invention is anticipated or obvious. In light of the explanations and some few amendments presented above, it can now be appreciated that the invention is new and unobvious.

Emerging from this debate about misunderstood passages in the cited art, and about verbal minutiae, it is important to return to basics and reassert what the invention is really all about. It is important to recognize that the invention is neither about factual misinterpretations nor about contorted semantics.

Rather the invention is about an extraordinary new capability that, in one single stroke, revolutionizes many different facets of the practice of incremental printing. As stated in the Applicants' specification (emphasis added):

"Preferred embodiments of the modified-matrix forms of the invention can reduce artifacts 53D, 53L, 54D, 54L (Fig. 1) due to drop-weight variation, optical-density variation (from shifts in drop shape and other factors as well as weight), ink/media interactions at boundaries; and also swath-height error 45H, 46H, without affecting page length."

Applicants therefore ask that this remarkable new multifunctional capability — not merely unobvious but actually quite amazing — be properly awarded the protection afforded under the Patent Statute.

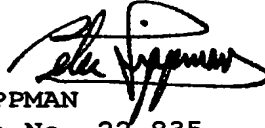
Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's favorable recon-

sideration and allowance of all the claims now standing in this case.

It is respectfully requested that, should there appear any further obstacle to allowance of the claims herein, the Examiner telephone the undersigned attorney to try to resolve the obstacle.

Respectfully submitted,



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